Using Vegetation to Assess Wetland Condition:

a multimetric approach for temporarily and seasonally flooded depressional wetlands and herbaceous-dominated intermittent and ephemeral riverine wetlands in the northwestern glaciated plains ecoregion, Montana

Prepared for:

Montana Department of Environmental Quality
and
U.S. Environmental Protection Agency

By:

W. Marc Jones

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SUMMARY

The Montana Department of Environmental Quality is implementing a comprehensive wetland monitoring and assessment program to evaluate the condition of the state's wetlands. As part of this effort, the Montana Natural Heritage Program is developing site-level numerical vegetation biocriteria for wetlands. Assessing wetland condition by measuring the response of the biological community has been successfully demonstrated in many wetland systems using a variety of taxa. This study attempted to evaluate wetlands by measuring vegetation response to anthropogenic stressors for temporarily and seasonally flooded depressional and herbaceous-dominated intermittent and ephemeral riverine wetlands in the northwestern glaciated plains ecoregion in north-central Montana. Sample wetlands were ranked along a human disturbance gradient based on site- and local landscape-level factors. Vegetation attributes that changed predictably along this gradient were identified and combined into a multimetric index for each wetland type. These indices were significantly related to wetland condition, as measured by the human disturbance gradient, for both depressional and riverine wetlands. When wetlands were divided into three disturbance categories (reference condition, moderately disturbed, and severely disturbed), vegetation metrics were able to correctly classify 73% of depressional and 86% of riverine wetlands sampled. The multimetric index for depressional wetlands responded primarily to on-site agricultural disturbance and was comprised of four metrics: the floristic quality index and relative cover of native perennials, species with a coefficient of conservatism ≥ 4, and exotic species. The riverine multimetric index responded primarily to on-site grazing intensity and included the richness of native perennials, Simpson diversity index, proportionate richness of tolerant species, relative cover of intolerant species, and floristic quality index.

Another aspect of this study was to evaluate the effectiveness of classifying watersheds (5^{th}-level U.S. Geological Survey hydrological units) into disturbance categories based on land use patterns. Watershed-scale disturbance categories showed no correlation with either wetland condition as measured by site-level and smaller-scale disturbance measures or vegetation metrics. Smaller-scale disturbance factors appear to be more important in determining condition of sampled wetlands in this study.

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TABLE OF CONTENTS

LIST OF TABLES

View Full Report

LIST OF FIGURES

View Full Report